

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

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Applicant's or agent's file reference

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FOR FURTHER ACTION

See paragraph 2 below

International application No.

PCT/US07/09810

International filing date (day/month/year)

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19 April 2006 (19.04.2006)

International Patent Classification (IPC) or both national classification and IPC

IPC: **G06F 3/14(2006.01),17/30(2006.01),7/00(2006.01)**

USPC: **345/440,440.2;707/100,102,104.1,3**

Applicant

TABLEAU SOFTWARE, INC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US

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Date of completion of this opinion

27 June 2008 (27.06.2008)

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Box No. 1 Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

a. type of material

- ☐ a sequence listing
- ☐ table(s) related to the sequence listing

b. format of material

- ☐ on paper
- ☐ in electronic form

c. time of filing/furnishing

- ☐ contained in the international application as filed.
- ☐ filed together with the international application in electronic form.
- ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

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Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims <u>1-77</u>	YES
	Claims <u>NONE</u>	NO
Inventive step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-77</u>	NO
Industrial applicability (IA)	Claims <u>1-77</u>	YES
	Claims <u>NONE</u>	NO

2. Citations and explanations:

Please See Continuation Sheet

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

Claims 1-77 lack an inventive step under PCT Article 33(3) as being obvious over Stolte et al. (U.S. Pub. No. 2004/0243593 A1).

With respect to claims 1, 20, 39, 58 and 77, Stolte discloses a method or a computer system of automatically generating models for a dataset, comprising:

generating a description to visualize a dataset (i.e., "*visually explore the database*" (0039)), allowing a user to provide a description by dragging and dropping fields into field containers of a graphical user interface (i.e., "*Shelves 708-4 and 708-5 are the axis shelves. The operands placed on shelves 708-4 and 708-5 (e.g., year, quarter, month, productive, product, market, state) determine the structure of visual table 720 and the types of graphs that are placed in each pane 722 of visual table 720*" (0109) and Examiner indicates "*product type*" (708-4) is one of the description), the description including multiple fields associated with a view of the dataset (i.e., "*algebraic expression is created by dragging a field in the plurality of fields in the database schema onto a shelf that represents an axis of the visual table*" (0053));

determining a set of properties for each of the multiple fields (i.e., "*The specification is used to map data values from a database 558 to visual properties by visual interpreter module 556*" (0118)); and

automatically translating (i.e., "*each shelf 708 that represents an axis of visual table 720 is translated into corresponding expression in an automated manner*" (0117)) the description (i.e., "*coffee*", "*espresso*", "*herbal tea*" and "*tea*" (0109)) into one or more models (i.e., "*A representative visual specification 550 is provided in FIG. 11 (element 550)*" (0110) and Examiner indicates that "*Specification*" is "*models*" of claimed invention) based on the respective properties of the multiple fields (i.e., "*presents the sale of each of these products*" (0109)) and a set of predefined heuristics (i.e., "*This is done by testing p-lookup against the selection criteria predicate in each pane specification in the visual specification*" (0138) or "*a user can specify any of the algebra (e.g., ordinal concatenation, etc.) described in section 5.4*" (0116));

automatically plotting the one or more models in a specific region of the graphical user interface (i.e., "*the type of graphic displayed in each pane 722 (e.g., circles, bars, glyphs, etc.), and the mapping of data fields to retinal properties of the marks in the visual tables (e.g., mapping "profit" to the size of the mark and mapping "quarter" to color)*" (0122) or "*This new tuple is then incorporated into the set of tuples for possible association with one or more panes 722 in the graphic that is specified by visual specification 550*" (0173)).

With respect to claims 2, 21, 40 and 59, Stolte discloses wherein the multiple fields are partitioned into a plurality of sets, each set associated with a respective region of the view including row, column, page, and an encoding area (i.e., "*The tuples can then*

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be partitioned into panes 722 locally in subsequent processing step" (0125) and fig. 7).

With respect to claims 3, 22, 41 and 60, Stolte discloses wherein each field includes a field type selected from the group consisting of categorical (i.e., "ProductType" (fig. 7 and 12)) and quantitative (i.e. "Quater/Month" (figs. 7 and 12)) and a data type selected from the group consisting of integer, real, Boolean, and time (i.e., "e.g., time, integer, float, character" (0191)).

With respect to claims 4, 23, 42 and 61, Stolte discloses wherein the set of predefined heuristics includes selecting two fields from the description, which may be potentially related (i.e., *algebraic expression*" (0043)), as an independent variable and a response variable of the models, and converting categorical fields in the description into factors of the models (i.e., *"the specification comprises an algebraic expression"* (0043) and *"In embodiments where the specification 550 makes use of the table algebra in the form of an algebraic expression, the specification includes at least one operand. An operand is a dimension level or a measure/quantitative variable from the database schema (or other database metadata) that has been selected for inclusion in the algebraic expression* (0119) or (0151-0157))

With respect to claims 5, 24, 43 and 62, Stolte discloses wherein the set of predefined heuristics further comprises:

defining a first quantitative field on the row (or the column) as a response variable and a second field on the column (or the row) as an independent variable if the first quantitative field is the only quantitative field on the row or the column of the view and the second field is either a quantitative field or a categorical field having a quantitative interpretation (fig. 7 show a first quantitative filed on the row is "profit" as an independent variable and second quantitative filed on the column is "sale" or "an operand is dimension level or a measure/quantitative variable from the database schema (or other database metadata) that has been selected for inclusion in the algebraic expression" (0119)); and

generating the one or more models using data in the dataset associated with the response variable and the independent variable (i.e., *"each axis of visual table 720 is defined by an expression from visual specification 550 that has been rewritten in normalized set form"* (0163)).

With respect to claims 6, 25, 44 and 63, Stolte discloses wherein the set of predefined heuristics further comprises:

defining a first quantitative field on the row (or the column) as a response variable and a second quantitative field on the column (or the row) as an independent variable if the second quantitative field is a quantitative field from a dimension class (i.e., *"there are three classes of operands: (1) ordinal field operands, (2) quantitative field operands, and (3) constant operands. Throughout the remainder of this section, the terms A and B represent ordinal field operands, P and Q represent quantitative field operands, C represents a constant operand, and X, Y, and Z represent expressions"* (0195)); and

generating the one or more models using data in the dataset associated with the response variable and the independent variable (i.e., *"each axis of visual table 720 is defined by an expression from visual specification 550 that has been rewritten in normalized set form"* (0163)).

With respect to claims 7, 26, 45 and 64, Stolte discloses wherein the set of predefined heuristics further comprises: defining a first quantitative field on the row as a response variable and a second quantitative field on the column as an independent variable (i.e., *"the specification organizes the one or more panes into a plurality of rows and a plurality of columns and the specification comprises a first algebraic expression for the plurality of rows and a second algebraic expression for the plurality of columns"* (0044) or *"Dimensions and measures are similar to independent and dependent variables in traditional analysis"* (0180)); and

generating the one or more models using data in the dataset associated with the response variable and the independent variable (i.e., *"each axis of visual table 720 is defined by an expression from visual specification 550 that has been rewritten in normalized set form"* (0163)).

With respect to claims 8, 27, 46 and 65, Stolte discloses wherein the set of predefined heuristics further comprises: repeating said defining and generating steps for each unique pair of first and second quantitative fields on the column and row (i.e., *"the constructing a visual table, the querying of the database, and the associating of a subset of tuples to a pane is repeated using a specification that is determined by the subset of the set of tuples associated with the pane"* (0052)).

With respect to claims 9, 28, 47 and 66, Stolte discloses wherein the set of predefined heuristics further comprises: defining each categorical field on the row, the column and the page of the view as a categorical factor (i.e., *"aspect ratio"* (0192)) of the one or more models (0192).

With respect to claims 10-11, 29-30, 48-49 and 67-68, Stolte discloses wherein the set of predefined heuristics further comprises: defining each categorical field in the encoding area as a categorical factor of the one or more models if there are more than one data points corresponding to each value in the categorical field (fig. 21 B shows there are more than one data point corresponding to each sale and profit).

With respect to claims 12, 31, 50 and 69, Stolte discloses wherein each of the one or more models has a model type including linear, polynomial, exponential, logarithmic, and transcendental (Figs. 7 and 21).

With respect to claims 13, 32, 51 and 70, Stolte discloses further comprising: displaying the view of the dataset in accordance with the description (Fig. 7 "coffee", "espresso", herbal tear" and "tea"); and displaying graphs corresponding to the one or more models (fig. 7)

With respect to claims 14, 33, 52 and 71, Stolte discloses further comprising: determining if it is possible to translate (i.e., *"each shelf 708 that represents an axis of visual table 720 is translated into corresponding expression in an automated manner"* (0117)) the description (i.e., *"coffee", "espresso", herbal tear" and "tea"* (0109)) into any model by examining

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the properties of the fields associated with the view (i.e., *"presents the sale of each of these products" (0109)*).

With respect to claims 15, 34, 53 and 72, Stotle discloses wherein the one or more models are statistical models (i.e., *"Journal of Statistical Computation and Simulation" (0028)*).

With respect to claims 16, 35, 54 and 73, Stotle discloses wherein generating a plurality of models using the description, each model having a specific model type and a set of parameters (i.e., *"each shelve 708 that represents an axis of visual table 720 is translated into corresponding expression in an automated manner" (0117)*);

automatically selecting from the plurality of modes one having a simpler model type and fewer parameters according to predefined criteria (i.e., *"using simple graphics in the cells" (0030)*).

With respect to claims 17, 36, 55 and 74, Stotle discloses wherein the description is generated by a user dragging and dropping a subset of the fields into respectively field containers of a graphical user interface (i.e., *"algebraic expression is created by dragging a field in the plurality of fields in the database schema onto a shelve that represents an axis of the visual table" (0053)*).

With respect to claims 18, 37, 56 and 75, Stotle discloses wherein the description is generated by a user selecting a subset of the field as field of interest through a graphical use interface (i.e., *"algebraic expression is created by dragging a field in the plurality of fields in the database schema onto a shelve that represents an axis of the visual table" (0053)*).

With respect to claims 19, 38, 57 and 76, Stotle discloses wherein the description is generated by a user entering a text string including a subset of the fields as fields of interest through a user interface (i.e., *"A user is allowed to enter a search query that is consistent with the novel formalism of the present invention" (0078)*).